Subject: rec.radio.amateur.packet Frequently Asked Questions
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Summary: Common quesions and answers about Packet Radio.
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Frequently Asked Questions for Amateur Packet Radio

Version 1.15 - Last modified 6/21/93

This document is for unlimited distribution.

Please send corrections and additions to:
   packet-faq@wattres.sj.ca.us
Which will expand to a list of people who are familiar with most packet
issues. I hope. ;-)

```
*********************************************************
N     N                              :
NN    N   oooo    ttttt  eeeeee   :::
N N   N  o    o     t    e         :
N  N  N  o    o     t    eeeee
N   N N  o    o     t    e         :
N    NN  o    o     t    e        :::
N     N   oooo      t    eeeeee    :
```

It's pledge month(s?) for the rec.radio.digital.misc FAQ. With the creation
of this new newsgroup, I will be needing some input to add coverage for the
other digital modes, i.e. RTTY, AMTOR, PacTOR, CLOVER, digital voice, and
so forth. If you have information on any of these areas that you think would
be helpful to other hams, please send it to digital-faq@Wattres.SJ.CA.US.

Thanks, and back to your regularly scheduled program.
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The Packet Radio FAQ list will be posted on a monthly basis to
rec.radio.amateur.packet and rec.radio.amateur.digital.misc. The current
version of this document is available via anonymous FTP at ftp.cs.buffalo.edu.

Many FAQ's, including this one, are available on the archive site
rtfm.mit.edu in the directory pub/usenet/news.answers. The name under
which a FAQ is archived appears in the Archive-Name: line at the top
of the article. This FAQ is archived as radio/packet-faq.

There is also a mail server on rtfm.mit.edu, which can be addressed as
mail-server@rtfm.mit.edu. For details on how to operate this server,
send a message to that address with the word "help" in the BODY of the
message.

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1 Basic Packet Radio Information

1.1 What is packet radio?

Packet radio is digital communications via amateur radio. Packet radio takes any digital data stream and sends that via radio to another amateur radio station. Packet radio is so named because it sends the data in small bursts, or packets.

1.2 What is amateur radio?

Amateur Radio (sometimes called Ham Radio) is individuals using specified radio frequencies for personal enjoyment, experimentation, and the continuation of the radio art. Amateur radio operators must be licensed by their government. In the United States, the Federal Communications Commission issues amateur radio licenses. Normally, a test on operating practices, radio theory, and in some cases morse code proficiency test is administered. Amateur radio is not to be used for commercial purposes. Also, amateur radio operators are restricted from using profanity and using amateur radio for illegal purposes.

For more information on Amateur Radio in general, see the monthly frequently asked questions posting in rec.radio.amateur.misc. A copy of that FAQ is also available from ftp.cs.buffalo.edu.

1.3 What can I do on packet radio?

Keyboard-to-Keyboard contacts:

Like other digital communications modes, packet radio can be used to talk to other amateurs. For those who cannot use HF frequencies, two amateurs can talk to each other from long distances using the packet radio network.

Packet BBS operations:

Many cities have one or more packet Bulletin Board System (BBS) available on the local packet network. Amateurs can check into the BBSes and read messages from other packet users on almost any topic. BBSes are networked together over the packet network to allow messages to reach a broader audience than just your local BBS users. Private messages may also be sent to other packet operators, either locally or who use other BBSes. BBSes have the latest ARRL, AMSAT, and propagation bulletins. Many BBSes have a file section containing various text files full of information on amateur radio in general.

DX Packet Cluster:

A recent development is use of packet radio for DX spotting. HF operators connect to the local DX Packet Cluster for the latest reports on DX. Often a user will 'spot' some hot DX and distribute the DX report real time.

File Transfer:

With special software, amateurs can pass any binary files to other amateurs. Currently, this is done with TCP/IP communications, YAPP, and other specialized protocols.

Satellite Communications:

Many of the amateur radio satellites contain microcomputer systems that can provide special information to amateurs. Some satellites contain CCD cameras on board and you can download images of the earth and the stars. Others provide store and forward packet mailboxes to allow rapid message transfers over long distances. Some satellites use AX.25, some use special packet protocols developed for satellite communications. A few transmit AX.25 packets over FM transmitters, but most use SSB transmissions.

1.4 Why packet over other digital modes?

Packet has three great advantages over other digital modes: transparency, error correction, and automatic control.

The operation of a packet station is transparent to the end user; connect to the other station, type in your message, and it is sent automatically. The Terminal Node Controller (TNC) automatically divides the message into packets, keys the transmitter and sends the packets. While receiving packets, the TNC automatically decodes, checks for errors, and displays the received messages. In addition, any packet TNC can be used as a packet relay station, sometimes called a digipeater. This allows for greater range by stringing several packet stations together.

Packet radio provides error free communications because of built in error detection schemes. If a packet is received, it is checked for errors and will be displayed only if it is correct.

With VHF/UHF packet, many countries allow packet operators to operate in automatic control mode. This means that you can leave your packet station on constantly. Other users can connect to you at any time they wish to see if you are home. Some TNC's even have Personal BBSes (sometimes called mailboxes) so other amateurs can leave you messages if you are not at home.

Another advantage of packet over other modes is the ability for many users to be able to use the same frequency channel simultaneously.

1.5 What elements make up a packet station?

TNC (Terminal Node Controller): A TNC contains a modem, a CPU, and the associated circuitry required to convert between RS-232 and the packet radio protocol in use. It assembles a packet from some of the data on the serial line, computing an error check (CRC) for the packet, modulates it into audio frequencies, and puts out appropriate signals to transmit that packet over the connected radio. It also reverses the process, translating the audio that the connected radio receives into a byte stream on the RS-232 port.

Most TNC's currently use 1200 BPS (bits per second) for local VHF and UHF packet, and 300 BPS for longer distance, lower bandwidth HF communication. Higher speeds are available for use in the VHF, UHF, and especially microwave region, but they often require unusual hardware and drivers.

Computer or Terminal: This is the user interface. A computer running a terminal emulator program, a packet-specific program, or just a dumb terminal can be used. For computers, almost any phone modem communications program can be adapted for packet use, but there are also customized packet radio programs available.

A radio: For 1200 BPS UHF/VHF packet, commonly available narrow band FM voice radios are used. For HF packet, 300 BPS data is used over single side band modulation. For high speed packet (anything greater than 1200 BPS), special radios or modified FM radios must be used.

1.6 What do you mean we can all use the same channel?

Packet radio uses a protocol called AX.25. AX.25 specifies channel access (ability to transmit on the channel) to be handled by CSMA (Carrier Sense Multiple Access). If you need to transmit, your TNC monitors the channel to see if someone else is transmitting. If no one else is transmitting, then the TNC keys up the radio, and sends its packet. All the other stations hear the packet and do not transmit until you are done. Unfortunately, 2 stations could accidentally transmit at the same time. This is called a collision. If a collision occurs, neither TNC will receive a reply back from the last packet it sent. Each TNC will wait a random amount of time and then retransmit the packet.

In actuality, a more complex scheme is used to determine when the TNC transmits. See the "AX.25 Protocol Specification" for more information.

1.7 What is AX.25?

AX.25 (Amateur X.25) is the communications protocol used for packet radio. A protocol is a standard for how two computer systems are to communicate with each other, somewhat analogous to using business format when writing a business letter. AX.25 was developed in the 1970's and based of the wired network protocol X.25. Because of the difference in the transport medium (radios vs wires) and because of different addressing schemes, X.25 was modified to suit amateur radio's needs.

AX.25 includes a digipeater field to allow other stations to automatically repeat packets to extend the range of transmitters. One advantage of AX.25 is that every packet sent contains the sender's and recipient's amateur radio callsign, thus providing station identification with every transmission.

1.8 Definitions: Commonly used terms in Amateur Packet Radio

44 net - The class A network designator for TCP/IP amateur packet radio. All numerical TCP/IP addresses are in the format 44.xxx.xxx.xxx.

AFSK - Audio Frequency Shift Keying. A method of representing digital information by using different audio frequencies modulated on a carrier.

AMPR - Amateur Packet Radio.

ampr.org - The high level domain recognized on Internet for amateur packet radio TCP/IP.

AX.25 - Amateur X.25 protocol. The basis of most packet systems. See section 1.7 for more information.

CRC - Cyclic Redundancy Check. The error detection scheme included in each packet. Verify that the packet was received error free.

CSMA - Carrier Sense Multiple Access. A system allowing many stations to use the same radio frequency simultaneously for packet communications.

digi - Short name for a digipeater

digipeater - A packet radio station used for repeating packets. See section 3.3.1 for more information.

FCC - Federal Communications Commission. Regulates and issues licenses for amateur radio in the United States.

FM - Frequency Modulation. The radio modulation scheme used for VHF and UHF packet communications.

FSK - Frequency Shift Keying. A method of representing digital information by shifting the radio carrier frequency different amounts to represent ones and zeros.

HDLC - (High-Level Data Link Control Procedures) A standard for high level link control. (ISO 3309)

KA9Q NOS - (KA9Q Network Operating System) A TCP/IP program originally developed by Phil Karn, KA9Q. Currently there are many different versions available. See section 3.2 for more information.

KA-Node - A simple networking scheme developed by TNC maker Kantronics. See section 3.3.2 for more info.

KISS - Keep It Simple Stupid. A simple interface developed for communications between TNCs and computers. This allows for most of the packet processing to be handled by the computer. Commonly used with packet TCP/IP software.

LAN - Local Area Network. A packet network developed for communications throughout a city or region. Often, the LAN uses separate frequencies from inter-city packet links.

modem - MODulator/DEModulator. Converts the analog signals into a binary data stream (a series of ones and zeros) for the TNC or a micro-computer. First step in decoding packets. It also converts binary data to analog, which is the last step in encoding packets.

NET/ROM - A scheme for packet radio networking. See section 3.3 for more information.

NODE - A network node. Often a network node running NET/ROM.

PPP - Point to Point Protocol. PPP is another protocol used for moving IP frames over a serial line. It supports host authentication, and non-transparent serial lines. It also has a standard way of negotiating header (and potentially data) compression over the line. See also SLIP.

protocol - A standard used for intercommunications between different

computer systems.

RS-232 (RS-323C) - A (more or less) standard for interconnection of serial peripherals to small computer systems. In packet radio, RS-232 is the most common interface between TNC's and the Computer/Terminal.

SLIP - Serial Line Internet Protocol. A trivial protocol for putting IP frames over a serial line to do (potentially) cheap TCP/IP networking. Approximately the same as KISS, except over wireline networks. See also PPP.

SSB - Single Side Band. The radio modulation scheme used for HF packet and satellite packet communications.

TAPR - Tucson Amateur Packet Radio. Was the first group to create a packet radio TNC using AX.25. Soon a TAPR TNC became cloned by many others. TAPR continues development of packet radio equipment.

TCP/IP - Transmission Control Protocol/Internet Protocol. A set of utility programs used over AX.25. See sections 3.2 for more information.

TNC - Terminal Node Controller. See section 1.5 for more information.

1.9 Do's and Don'ts : Rules and Regulations

NOTE: These regulations apply only to amateurs regulated by the FCC (United States), but often are similar to regulations in other countries.

[Since I have no experience with amateur radio in other countries, I cannot make any comments. Please bring any notable exceptions to my attention. -ed]

Although there are no specific rules that apply to amateur packet radio, the general amateur radio rules force some restrictions on packet usage.

Can I set up a TNC at home and one at work so I can check my Electronic mail via packet?

This cannot be done without special restrictions. Amateur radio rules prohibit any business. Since you could have mail from your boss (or maybe even someone selling you something over Internet), that would constitute business activity and is specifically prohibited.

Profanity can also be a complication. Since you have no control over the language used in E-mail, proper filtering is required. Since no filter scheme can catch every offense, it is best to say every message must be hand filtered.

I would like to set up a packet radio gateway between a land line computer network and the packet network. Is this possible?

Yes, and there are several such gateways in use, but they must be managed with caution. Electronic mail may be passed FROM the packet network INTO the land line network without intervention. However, mail passed TO packet radio is considered third party traffic (the sender is not an amateur) and these messages must be hand filtered to ensure that rules of message content are followed.

It's my license if I use packet radio illegally anyway, so what does anyone else care!?

Packet radio is one of the few NETWORKED systems in amateur radio. Many people have helped develop the network and there are many amateurs who own parts of the packet radio network. Sending packet BBS mail, digipeating, and sharing the channel involves the licenses of MANY people. Because of FCC rules stating that anything to come out of a transmitter (either in automatic mode or via your direct control) is the licensee's responsibility, one illegal message sent over the packet radio network could literally jeopardize the licenses of thousands of other amateurs. When in doubt, it is best to check with other amateurs about sending the message before it is sent.

I have some ideas on how to use packet radio in a new way, but I don't know if it is legal. Who could tell me if I can do it legally?

The worst thing you can do is talk to the FCC about such an issue. The FCC rules are written to be general enough to encompass but not restrict new radio activities. In the past, any non-thought-out requests sent to the FCC have meant a reduction of privilege for all amateur radio operators.

The best source for legal assistance is your national amateur radio association. In the United States, that is the American Radio Relay League (ARRL). Another good place for such conversations is over Usenet/packet mailing lists, or the amateur radio BBS network.

2 Computing Network Resources for Amateur Packet radio

This section summarizes the resources available on Internet for amateur packet radio operators.

2.1 What Newsgroups/mailing lists are available?

This is a list of all groups that regularly discuss amateur packet radio. For newsgroups, join the group through use of your news reader. For mailing lists, add a '-request' to the end of the list name to request subscriptions. For listserv groups, send mail to 'listserv' at the node which contains the list. The first line of the mail should be 'SUBSCRIBE groupname yourname'. Send the command 'help' for more information.

rec.radio.amateur.packet (Newsgroup): General discussions involving Packet Radio.

rec.radio.amateur.misc (Newsgroup): General amateur radio discussion. Usually does not contain any particular information about Amateur Packet Radio.

rec.radio.amateur.policy (Newsgroup): Discussion of regulation policies regarding every aspect of amateur radio. Occasionally deals with policies of packet coordination and legal issues of packet radio.

rec.radio.swap (Newsgroup): General For-Sale for any radio equipment. Occasionally will have packet equipment for sale. Recommended location for any amateur packet radio for-sale items.

info-hams@ucsd.edu (Listserv group): A digest redistribution of the rec.radio.amateur.misc Usenet discussion.

packet-radio@ucsd.edu (Listserv group): A digest redistribution of the rec.radio.amateur.packet Usenet discussion.

ham-policy@ucsd.edu (Listserv group): A digest redistribution of the rec.radio.amateur.policy Usenet discussion

hs-modem@wb3ffv.ampr.org (Mailing list): Discussion of high speed modems and radios available and future plans. Also includes discussion of networking using high speed modems.

tcp-group@ucsd.edu (Mailing list): Group discussion of technical developments of TCP/IP over packet radio and use of the NOS TCP/IP programs.

gateways@uhm.ampr.org (Mailing list): Discussion of current gateways and future plans for gateways. May deal with sensitive internetworking issues.

listserv@knuth.mtsu.edu has several interesting mailing lists available:

GRAPES-L	Discussions with GRAPES (Georgia Radio Amateur Packet Enthusiasts Society) on 56kb WAN's and the WA4DSY 56kb RF modem that they distribute.
TENNET-L	Tennessee's efforts at a coordinated high-speed RF packet network
GRACILIS-L	Discussions on Gracilis tcp/ip packet equipment. Includes some of the people from Gracilis.
KA9Q-UNIX	Discussions on porting and using various versions of KA9Q Unix/Xenix NET/NOS under any of a variety

of Unix/Xenix variants.

TNV-HAMS General discussions amoung email connected amateur radio operators in and surrounding Tennessee

Send a message with a body of "HELP" to get help from the list server. Also, Internet users may now INTERACTIVELY work with the ListServ there by:

telnet knuth.mtsu.edu 372

or

telnet 161.45.1.1 372

For all lists at ucsd.edu, archives may be found via anonymous FTP at ucsd.edu. Some listserv groups also have archives. Send the command 'help' to the group's listserv for more information. Digest mailings for the ucsd.edu discussions are also available. Send mail to listserv@ucsd.edu with the first line being 'longindex' for more information.

Terry Stader (KA8SCP) <tstader@aol.com> maintains a list of Mac packet-related software, and posts it periodically (somewhat less often than monthly) to rec.radio.amateur.packet.

2.2 What anonymous FTP sites and electronic mail servers are available for getting packet radio information and programs?

This is a sampling of FTP sites that carry amateur packet radio related files. Consult the Archie archive server for info on locating particular files. For more information on using archie, send mail to archie@cs.mcgill.edu with the line 'help'.

ucsd.edu

Primary distribution site of KA9Q's derived TCP/IP packages. Also, general packet radio information in the /hamradio/packet subdirectory.

wsmr-simtel20.army.mil

Very large collection of amateur radio software.

wuarchive.wustl.edu

Mirror site of Simtel20 archives. Unix directory structure, which is easier to use then the simtel20 archive.

ftp.cs.buffalo.edu

Supplimental archive site for amateur radio information. Contains current copies of all rec.radio.amatuer.* FAQ's.

tomcat.gsfc.nasa.gov

Packet software including Baycomm, ROSE, G8BPQ, NOS, etc.
(I have one report (from George Hitz, W1DA) that this FTP site will be down until the end of this summer, 1993. Reportedly the site admin is going to be in Sweden.)

akutaktak.andrew.cmu.edu

SoftKiss for the Mac, in /aw0g. Requires NET/Mac.
SoftKiss is an init/cdev/driver that allows a MAC to do packet using a Poor Man's Packet modem.

sumex-aim.stanford.edu

NET/Mac is the port of KA9Q's NET program. It doesn't have nifty features like scrolling or saving the windows, but the individual sessions can be recorded into a file.

As for mail servers, there is only one that I know of at the moment:

Ham-Server@GRAFex.Cupertino.CA.US

This mail server has a wide variety of information on most aspects of

amateur radio, not just packet. Send a message with the body HELP to get a fairly useful listing.

2.3 How do I contact the ARRL via electronic mail?

There are various addresses at ARRL HQ, but the most important one is probably info@arrl.org. That is where general information about the ARRL can be acquired. This address reaches a person, so you'll have to specify what/who you're looking for.

2.4 Are there any gateways for mail or news between Internet and Amateur Packet radio?

Internet / Packet Radio BBS Gateways

There are currently two comprehensive gateways between the Internet and the packet radio BBS system. One is run by Jim Durham, W2XO, in Pennysylvania and the other, which allows access to PBBS bulletins, as well as mail, is run by Bob Arasmith, N0ARY, in California.

2.4.1 The W2XO Gateway

To mail from Internet to Packet:

1. Mail to: "bbs@w2xo.pgh.pa.us"

2. Make the first line of the text a Packet BBS "send" command, ie:
SP TOCALL @ BBSCALL.ROUTING-HINTS < FROMCALL

3. The "subject" line of the Internet mail becomes the "title" line of the Packet BBS mail.

NOTE: Because of FCC regulations, Jim must hand filter each message sent FROM Internet TO the Amateur Packet Radio BBS system. Messages should be of minimal length and appropriate content. Read Section 1.9 (Do's and Don'ts: Rules and Regulations) regarding appropriate usage of packet radio for more information. Always include the routing hints with the BBS callsign.

To mail from Packet to Internet:

1. The amateur radio operator must have his callsign registered in the gateway alias list. If you want to mail from packet to a specific amateur on Internet, send mail to 'durham@w2xo.pgh.pa.us' (Internet) or 'W2XO @ W2XO.#WPA.PA.USA.NOAM' (Packet BBS mail) with his/her amateur callsign and their Internet address.

2. Once the above is accomplished, packet BBS mail should be sent to 'CALL @ W2XO.#WPA.PA.USA.NOAM'. The mail will automatically be forwarded to the Internet address of the amateur with the 'CALL' callsign.

Jim Durham's Internet address is 'durham@w2xo.pgh.pa.us'.

2.4.2 The N0ARY Internet mail <-> full packet BBS gateway

Bob Arasmith, N0ARY, runs a gateway between the Internet mail system and PBBS system. His gateway allows you to read, post, and respond to other postings on the PBBS system via email. For more information, send mail to gateway_info@arasmith.com.

2.4.3 LAN Gateways (Packet wormholes via Internet)

Currently a group of amateurs are experimenting with connecting packet LANs together via Internet IP inside IP Encapsulation. Some of the gateways only accept TCP/IP packets, others AX.25 packets. These gateways uses the Internet as a transport medium, thus it is impossible to access the packet radio network from Internet. For more information, join the Gateways mailing list by sending mail to "gateways-request@uhm.ampr.org".

3 Networking and special packet protocols

This is a sample of some of the more popular networking schemes available today. By far, there are more customized networking schemes

used than listed. Consult your local packet network guru for specific network information.

3.1 Are there any other protocols in use other than AX.25?

AX.25 is considered the defacto standard protocol for amateur radio use and is even recognized by many countries as a legal operation mode. However, there are other standards. TCP/IP is used in some areas for amateur radio. Also, some networking protocols use other packet formats than AX.25.

Often, special packet radio protocols are encapsulated within AX.25 packet frames. This is done to insure compliance with regulations requiring packet radio transmissions to be in the form of AX.25. However, details of AX.25 encapsulation rules vary from country to country.

3.2 What is TCP/IP?

TCP/IP stands for Transmission Control Protocol/Internet Protocol. This is commonly used over the Internet wired computer network. The TCP/IP suite contains different transmission facilities such as FTP (File Transfer Protocol), SMTP (Simple Mail Transport Protocol), Telnet (Remote terminal protocol), and NNTP (Net News Transfer Protocol)

TCP/IP doesn't use all of the AX.25 protocol. Instead, it uses special AX.25 packets called Unnumbered Information (UI) packets and then puts its own special protocol (called IP) on top of AX.25. This is used to increase efficiency of its transmissions, since IP does not require packets to be "reliable", that is to say, guaranteed delivered error-free. TCP handles the retransmission of lost and garbled packets in its own way, at a higher level. Therefore the extra information in an AX.25 "VC" (virtual circuit) frame is not useful, and thus consuming needed bandwidth.

The KA9Q NOS program (also called NET) is the most commonly used version of TCP/IP in packet radio. NOS originally was written for the PC compatible. However, NOS has been ported to many different computers such as the Amiga, Macintosh, Unix, and others. Smaller computers like the Commodore 64 and the Timex-Sinclar do not currently have version of NOS available.

3.3 Networking Schemes

What are some of those other networking schemes?

During the early days of amateur packet radio, it became apparent that a packet network was needed. To this end, the following packet network schemes where created.

Digipeaters

The first networking scheme with packet radio was Digipeaters. Digipeaters would simply look at a packet, and if its call was in the digipeater field, would resend the packet. Digipeaters allow the extension of range of a transmitter by retransmitting any packets addressed to the digipeater.

This scheme worked well with only a few people on the radio channel. However, as packet became more popular, digipeaters soon were clogging up the airwaves with traffic being repeated over long distances. Also, if a packet got lost by one of the digipeaters, the originator station would have to retransmit the packet again, forcing every digipeater to transmit again and causing more congestion.

KA-Nodes

Kantronics improved on the digipeater slightly and created KA-Nodes. As with digipeaters, KA-Nodes simply repeat AX.25 frames. However, a KA-Node acknowledges every transmission each link instead of over the entire route. Therefore, instead of an end-to-end acknowledgement, KA-Nodes allow for more reliable connections with fewer timeouts, because acknowledgments are only carried on one link. KA-Nodes therefore are more reliable than digipeaters, but are not a true network. It is similar like having to wire your own telephone network to make a phone call.

NET/ROM

NET/ROM was one of the first networking schemes to try to address the problems with digipeaters. A user connects to a NET/ROM station as if connecting to any other packet station. From there, he can issue commands to instruct the station to connect to another user locally or connect to another NET/ROM station. This connect, then connect again, means that to a user's TNC, you are connected to a local station only and its transmissions do not have to be digipeated over the entire network and risk loosing packets. This local connection proved to be more reliable.

NET/ROM is a commercial firmware (software put on a chip) program that is used as a replacement ROM in TAPR type TNC's. Other programs are available to emulate NET/ROM. Among them are TheNet, G8BPQ node switch, MSYS, and some versions of NET.

NET/ROM nodes, at regular intervals, transmit to other nodes their current list of known nodes. This is good because as new nodes come on-line, they are automatically integrated in the network. However, if band conditions such as ducting occur, ordinarily unreachable nodes can be entered into node lists. This causes the NET/ROM routing software to choose routes to distant nodes that are impossible. This problem requires users to develop a route to a distant node manually defining each hop instead of using the automatic routing feature.

ROSE

ROSE is another networking protocol derived from X.25. Each ROSE node has a static list of the nodes it can reach. For a user to use a ROSE switch, he issues a connect with the destination station and in the digipeater field places the call of the local rose switch and the distant rose switch the destination station can hear. Other then that, the network is completely transparent to the user.

ROSE's use of static routing tables ensures that ROSE nodes don't attempt to route packets through links that aren't reliably reachable, as NET/ROM nodes often do. However, ROSE suffers from the inability to automatically update its routing tables as new nodes come online. The operators must manually update the routing tables, which is why ROSE networks require more maintainance.

3.4 BBS message transfer

Many of the BBS programs used in packet radio allow for mail and bulletins to be transferred over the packet radio network. The BBSes use a special forwarding protocol developed originally by Hank Oredsen, W0RLI.

Besides full service BBSes, many TNC makers have developed Personal BBS software to allow full service BBSes to forward mail directly to the amateur's TNC. This allows operators to receive packet mail at night and avoid tying up the network during busy hours.

--
Steve Watt KD6GGD Packet: KD6GGD @ N0ARY.#NOCAL.CA.USA.NA
ICBM: 121W 56' 53.1" / 37N 20' 16.7" Internet: steve@wattres.SJ.CA.US
Never trust a computer bigger than you can lift. also news,root,sys,uucp,...
•